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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
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Seattle, WA 98115-0070

Refer to:
OHB2002-0083-FEC

June 26, 2002

Gloria D. Brown
Forest Supervisor
Siuslaw National Forest
P.O. Box 1148
Corvallis, Oregon 97339

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act
Essential Fish Habitat Consultation for Karnowsky Creek Restoration Project, United
States Forest Service, Siuslaw National Forest, Siuslaw River Basin, Lane County,
Oregon.

Dear Ms. Brown:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act (ESA) that addresses the proposed Karnowsky Creek Restoration in Lane County, Oregon. In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Oregon Coast coho salmon (*Oncorhynchus kisutch*), or destroy or adversely modify its designated critical habitat. As required by section 7 of the ESA, NMFS has included reasonable and prudent measures with nondiscretionary terms and conditions that are necessary to minimize incidental take associated with this action.

The attached Opinion contains an analysis of the effects of the proposed action on designated critical habitat. Shortly before the issuance of this opinion, however, a Federal court vacated the rule designating critical habitat for the evolutionarily significant unit considered in this opinion. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard, even though they no longer have independent legal significance. Also, if critical habitat is redesignated before this action is fully implemented, the analysis will be relevant when determining whether a reinitiation of consultation will be necessary at that time. For these reasons and the need for timely issuance of this Opinion, our critical habitat analysis has not been removed from this Opinion.

This Opinion also serves as consultation on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and implementing regulations at 50 CFR Part 600. In this consultation, NMFS concludes that the proposed action may adversely affect designated EFH. NMFS has included conservation recommendations to avoid, minimize, or otherwise offset affects to designated EFH produced by this project.



Please direct questions regarding this Opinion to Robert Markle, of my staff, in the Oregon Habitat Office at 503.230.5419.

Sincerely,

A handwritten signature in black ink that reads "Russell M. Strach for". The signature is written in a cursive, flowing style.

D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7
Consultation
&
Magnuson-Stevens Act
Essential Fish Habitat Consultation


BIOLOGICAL OPINION

Karnowsky Creek Restoration Project
Siuslaw River Basin,
Lane County, Oregon

Agency: U.S. Forest Service, Siuslaw National Forest

Consultation
Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: June 26, 2002

Issued by: 

D. Robert Lohn
Regional Administrator

Refer to: OHB2002-0083-FEC

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1. ENDANGERED SPECIES ACT

1.1 Background

On April 2, 2002, the U.S. Forest Service (Forest Service) requested formal consultation under section 7 of the Endangered Species Act (ESA) on the Karnowsky Creek Restoration Project located in the Siuslaw River Basin in Lane County, Oregon. The proposed action will occur on Federally-owned land. Funding has been provided by the Oregon Watershed Enhancement Board, National Forest Foundation, and the Pacific Coast Watershed Partnership. Partners in this project include the Forest Service, Siuslaw Watershed Council, Siuslaw Soil and Water Conservation District, and Mapleton Middle School.

This biological opinion (Opinion) considers the potential effects of the proposed action on Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*). The subject action will occur within designated critical habitat for this species. The National Marine Fisheries Service (NMFS) listed OC coho salmon as threatened on August 10, 1998 (63 FR 42587), and designated critical habitat for the species on February 16, 2000 (65 FR 7764). NMFS issued protective regulations for this species on July 10, 2000 (65 FR 42422).

This Opinion contains an analysis of the effects of the proposed action on designated critical habitat. Shortly before the issuance of this opinion, however, a Federal court vacated the rule designating critical habitat for the evolutionarily significant unit (ESU) considered in this opinion. The analysis and conclusions regarding critical habitat remain informative for our application of the jeopardy standard, even though they no longer have independent legal significance. Also, if critical habitat is redesignated before this action is fully implemented, the analysis will be relevant when determining whether a reinitiation of consultation will be necessary at that time. For these reasons and the need for timely issuance of this Opinion, our critical habitat analysis has not been removed from this Opinion.

The objective of this Opinion is to determine whether the proposed action is likely to jeopardize the continued existence of OC coho salmon, or destroy or modify designated critical habitat for this species. This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

1.2 Proposed Action

Restoration of the historic wetland, stream, and vegetation processes in the Karnowsky valley is the stated purpose of the Karnowsky Creek Restoration Project. This includes the recreation of coho salmon habitat to enhance summer and winter rearing, and restoring valley hydrologic conditions and vegetation assemblages. Project design was modeled after the Enchanted Valley Stream Restoration Project. The biological assessment (BA) submitted by the Forest Service included a summary of the proposed project (channel lengths provided in the BA have been revised to reflect changes in the proposed action):

“... an estimated [17,040 feet] of new meandering stream channel would be constructed within the Karnowsky Creek valley to replace the channelized, diked and down-cut streams that now exist there. This construction would include [5,200 feet] in the lower tidally influenced portion of the valley, [4,100 feet] of channel just above tidal influence, and [7,740 feet] of higher gradient mainstem and tributary streams (Map 3). Portions of the old ditches would be filled to create ponds that would connect back into the newly constructed channel, many with small tributaries passing through them to maintain water quality. Gordy Reeves, PNW Research Fish Biologist, has urged us to establish both rearing ponds and good connections to these ponds. Reeves verified the high value of these ponds for winter rearing and the ability of fish to use them as long as they are well connected”.

The project will be implemented in three phases (Tables 1 and 2). This consultation addresses the first two phases of the project. The third phase is contingent upon acquiring the downstream property and has not been fully defined at this time. The BA describes in detail Phases I and II:

PHASE I

Lower End From USFS/private boundary to Approximately the middle of the valley

Construction of a new sinuous stream channel that is very connected to the floodplain will be completed. This construction would include... the lower tidally influenced portion of the valley... Side and tidal channel creation will also occur, especially in the tidally influenced area to create additional and varied habitat. Portions of the drainage ditches and old main channel will be plugged with compacted fill material to prevent the stream from reclaiming the old channel and to help maintain a higher water table. A non-functioning culvert at the mouth of Skunk Cabbage Creek will be removed to allow free passage of aquatic organisms but temporary access will be maintained over this site to get heavy equipment to the head of the valley. During construction there will not be water within the drainage ditches, however there will be water in the main channel. Fish present in those portions of the current channel that are to be filled will be seined and moved either upstream to the locations where ponds will be maintained, or downstream to the portion of Karnowsky located on private lands whichever is closer. Hummocks and depressions will be built for terrestrial and riparian dependent creatures that may benefit from this wetland restoration. Planting of willow, some alder and

conifer, native shrubs, and native wetland species will occur the following winter/spring after the channel construction is completed. Water will be re-introduced into this channel the year the channel is created. [This aspect has been revised. Channel connection at the lower end is currently proposed to occur during the year of construction, but the upper connection is now proposed to take place the following summer (P. Burns, personal communication with R. Markle, 23 May 2002).] There is no opportunity to let this channel vegetate for a year since the valley actively floods during the winter and the channel would be flowing bankfull[1] anyway even if we didn't plug the old channel. No channel hardening (rip rap or bioengineering) will be required since the channel will be designed to be a stable stream channel. A stable channel will have erosion and deposition sites along the channel but will maintain an equilibrium of cutting and depositing. Channel design was developed through the use of historical aerial photos that show the old meandering channel prior to being diked and straightened, stream flow measurements taken at various flows, and comparisons with reference channels in the area.

Valley middle

There will be no channel reconstruction in this area. Karnowsky Creek in this area contains the best available habitat for coho salmon in the Karnowsky drainage. Perennial flow is maintained with a gravel rich substrate and adequate pools to support coho throughout the year. Large wood and complex deep pools are very limited. Portions of old dikes (Map 3) will be removed. Drainage ditch on opposite side of valley will be filled with dike material, material from roadbed, and material from borrow sites. Large wood will be added to this channel in this phase and in Phase II. Riparian vegetation will be planted including conifer, alder, willows and native shrubs. Small patches of non-native plants, such as small patches of reed canary grass, will be removed with heavy equipment by scalping.

Top of Valley Mainstem

There is a remnant channel where Karnowsky Creek used to meander across the valley in this section. Phase I includes the excavation of this remnant channel, placement of large wood in this channel and planting of conifer, alder, willows and other native shrubs. This channel will not be connected to the main

Karnowsky Creek in Phase I to allow for vegetation to become re-established, and to minimize the potential for sediment to be mobilized and deposited in the middle of the valley where the best habitat exists in the subwatershed for coho salmon when the water is allowed to flow in the new channel the following year. The new channel will empty into the mainstem Karnowsky where the stream is perennial and has aggraded and is actively working with the floodplain. The large wood will come from mature conifer stands located adjacent to the valley floor. These stands are within the riparian reserves and within the stream influence zone. The stands are well stocked. Individual live trees will be selected by fish and wildlife specialists to determine which trees are appropriate. Trees will range in size from 24 to 36" dbh and will primarily be Douglas fir and some trees will have rootwads attached. There are 3 survey and manage bryophyte and lichen sites that will be avoided and buffers maintained around those sites. Approximately 1 acre of the valley will be regraded to supply fill material for the plugs to fill the current channel the following year. This regraded area will be on the opposite side of the valley of the current stream and will not have the potential to supply sediment to the new or old channels. This site will be replanted with native grass seed and planted with trees and shrubs.

PHASE II

Top of Valley Mainstem

The current channel in this section is severely downcut (10 ft). To enable the water to flow in the new channel a large stream plug will be installed in the current channel below the southerly tributary at the very top of the project area (Map 3). A large pool will be excavated at the tributary junction to allow the transition from a downcut channel to a channel that is functioning with its floodplain to occur more smoothly. This technique was used in Enchanted Valley and worked extremely well. Over time this pool will accumulate substrate material and cause aggradation up mainstem Karnowsky Creek above the project area and also up the downcut tributary at the transition site. The current stream in this location goes dry by the end of June so we do not expect to have the need to move fish from this location. Isolated pools will be checked for fish prior to filling the channel. Stockpiled material

from the... excavation in Phase I will be pushed and compacted into the old channel. Additional borrow sites along the old channel, old deposits and road fills, will be developed to provide enough material to fill large portions of this very deep entrenched channel. Location for off channel pools will be left in the old channel at the small tributary junctions to add more rearing habitat for coho and other aquatic dependent riparian species.

Valley middle

Phase II activity in this section will include the remainder of the wood placement and the completion of the removal of the old roadbed and the transportation of this material for filling ditches at other locations. The remainder of the logs will be placed with the use of a helicopter. The trees will be a combination of logs that have been stockpiled from blowdown that occurred in the spring of 2002 and the removal of trees from along the ridgeline road above the Karnowsky Creek drainage. The wood will be placed in locations that will encourage the use of the floodplain and also areas where we want to encourage streambed aggradation. Due to the presence of unsurveyed suitable habitat for marbled murrelet, the US Fish and Wildlife Service has placed an October 1 start date on the helicopter placement of the wood. Stream complexity will be improved dramatically.

Lower End from USFS/private boundary to approximately the middle of the valley.

Phase II activity in this section will include helicopter wood placement, planting, removal of road fills, additional invasive weed control, and additional filling of drainage ditches and the old channel. Wood placement will be of whole trees both in the channel and on the floodplain. Wood on the floodplain will especially be emphasized in the tidally influenced area for development of off-channel rearing habitat. Planting of riparian vegetation will continue along the new channel. Road fills, dikes and temporary bridges in this section will be removed at the completion of this phase.

Main Tributaries

These tributaries, each previous section has one major tributary, are similar to the channel at the top of the valley. The streams are straightened and severely downcut and are dry by early summer. Coho rearing habitat is severely limited and spawning habitat is marginal...

Under Phase II, the Forest Service proposes to conduct restoration activities in three tributary streams. Tributary 1 flows northeast and enters Karnowsky Creek just upstream of the private/Forest Service property line at approximately stream mile 1. Tributary 2, also referred to as Cattle Feeder Tributary, flows north and enters Karnowsky Creek at approximately stream mile 1.75 (near homestead site). Tributary 3 flows southwest and enters Karnowsky Creek at approximately stream mile 2.

Table 1. The Karnowsky Creek Restoration Project Will Be Implemented in Three Phases.

Phase I	Excavate 7,070 feet of new channel (2,770 feet tidal and 4,300 feet non-tidal). Plug existing channel. Create off-channel ponds at tributary junctions. Fill drainage ditches and remove culverts at Skunk Cabbage Creek. Remove middle valley dikes. Excavate remnant channel in top of valley. Place some large wood in new channel. Regrade portions of valley bottom. Conduct riparian planting at select sites.
Phase II	Plug existing channel at top of valley. Place additional wood. Conduct additional riparian planting. Excavate and re-grade tributary valleys.
Phase III	Finish stream channel work and road removal in lower tidal reach. Remove dikes and tide gates.

Table 2. The Karnowsky Creek Restoration Project Will Construct New Stream Channels and Plug Existing Channels.

Channel Reach	New Channel Constructed (ft)	New Channel Type (Rosgen)	Excavation Quantity (cy)	Existing Channel Filled (ft)	Fill Quantity (cy)	Additional Fill Quarried (cy)
Tidal mainstem	5,200	E	6,000	3,300	4,300	4,300
Non-tidal lower mainstem	4,100	E/C	3,200	2,440	5,775	2,575
Middle mainstem	0	-	0	2,125	2,150	2,150
Upper mainstem	2,150	C	700	1,025	6,670	5,970
Tributary 1	2,040	C	750	2,500	4,875	4,125
Tributary 2	2,600	C	960	2,365	3,665	2,705
Tributary 3	950	C	210	880	3,265	3,055
Total	17,040	-	11,820	14,635	30,700	24,880

1.3 Biological Information and Critical Habitat

Although there are currently limited data to assess population numbers or trends, all coho salmon stocks comprising the OC coho salmon ESU are apparently depressed, relative to past abundance. The status and relevant biological information concerning OC coho salmon are well described in the proposed and final rules from the Federal Register (60 FR 38011, July 25, 1995; and 63 FR 42587, August 10, 1998, respectively), and Weitkamp *et al.* (1995).

Abundance of wild coho salmon spawners in Oregon coastal streams declined during the period from about 1965 to roughly 1975 and has fluctuated at a low level since that time (Nickelson *et al.* 1992). Spawning escapements for this ESU may be at less than five percent of abundance from that in the early 1900s. Contemporary production of coho salmon may be less than

10 percent of the historic production (Nickelson et al. 1992). Average spawner abundance has been relatively constant since the late 1970s, but preharvest abundance has declined. Average recruits-per-spawner may also be declining. The OC coho salmon ESU, although not at immediate danger of extinction, may become endangered in the future if present trends continue (Weitkamp *et al.* 1995).

The bulk of production for the OC coho salmon ESU is skewed to its southern portion where the coastal lake systems (*e.g.* Tenmile, Tahkenitch, and Siltcoos Basins) and the Coos and Coquille Rivers are more productive. Siuslaw River coho salmon populations have been characterized as depressed (*e.g.*, spawning habitat underseeded, declining trends, or recent escapements below long-term average) and at moderate risk of extinction (Weitkamp *et al.* 1995).

The Siuslaw River watershed has approximately 514 miles of coho salmon spawning habitat (Hollen *et al.* 1998). Coho salmon abundance in the Siuslaw River is approximately two percent of historic levels. A recent estimate of average annual wild coho salmon spawner abundance is 3,842 spawners ($n=11$) with a range of 668 spawners (1997) to 7,625 spawners (1996) (ODFW 2001). Preliminary 2001 return estimates indicate approximately 11,024 wild coho salmon spawners (ODFW 2002). Historic coho salmon runs were estimated to be approximately 209,000 adults (circa 1890) (EcoTrust 2002). Estimates of historic coho salmon production indicate the Siuslaw River Basin (562 coho/mi²) was twice as productive as the adjacent Yaquina (204 coho/mi²) and Alsea (261 coho/mi²) River Basins (EcoTrust 2002).

A watershed assessment (EcoTrust 2002) describes coho salmon use in the Siuslaw basin.

... coho salmon numbers are severely depressed. Coho are found in all but the smallest headwater tributaries within the basin. They are also absent from the mainstem Siuslaw river and mainstems of major tributaries during the hot summer months. While our whole basin juvenile distribution for coho is scanty, available recent records from agencies and the one year of snorkel counts suggest that some areas are more important than other areas for the current production of coho salmon in the basin. [...]

Coho salmon and steelhead trout are the two most depressed salmonids in the Siuslaw basin. Both these species reside spatially in similar sized streams (however they differ in their preferred habitat). They both typically live for over a year in freshwater. The majority of Chinook salmon reside in freshwater for only a few months in the spring, then head to the estuary. This suggests that the existing freshwater habitat (below the headwater reaches inhabited by cutthroat) is likely not in good condition for summer and winter rearing. This thesis is corroborated by the fact that habitat surveys for these reaches note mostly poor quality.

It may also be more than coincidence that coho salmon and steelhead trout are the two salmonids that are most depressed, and they have had a history of the most significant hatchery programs within the basin. The two species that are considered to be in the best shape, Chinook salmon and resident cutthroat, are the two that have not had any significant hatchery program in the basin.

Timing of adult coho salmon river entry is largely influenced by river flow. Coho salmon normally wait for freshets before entering rivers. In the Siuslaw River watershed, adults are believed to typically enter the river between September and mid-January (Tami Wagner, ODFW, personal communication via telephone with R. Markle, February 6, 2001) with peak migration into the Siuslaw River occurring in October (Mullen 1981, as cited in Weitkamp *et al.* 1995). Spawning occurs from late October to late January with peak spawning generally occurring in mid-December (Weitkamp *et al.* 1995). After rearing in freshwater for what is typically one winter (but may be two or more winters) juvenile coho salmon migrate to estuaries and the ocean during spring. Reports of outmigration timing vary from February through June (Rodgers *et al.* 1993, as cited in Weitkamp *et al.* 1995) to March into early July (Tami Wagner, ODFW, personal communication via telephone with R. Markle, February 6, 2001). Estuary residency may vary from less than one month to more than 3.5 months, dependent on fish age and/or size (Miller and Sadro 2000). Estuary rearing and outmigration has been observed during non-conventional periods such as fall and winter. Juvenile coho salmon growth in estuaries may be nearly twice that found in freshwater (Miller and Sadro 2000).

Coho salmon are present in Karnowsky Creek throughout the project area (Table 3). The best available habitat exists in the middle reach. The BA submitted by the Forest Service states that the upper reaches of Karnowsky Creek dewater during summer and rearing juveniles take refuge in the middle reach where gravel substrate, riparian vegetation, and perennial flow provide acceptable habitat.

Table 3. Fish Surveys Have Established That Coho Salmon Are Present in Karnowsky Creek Within the Project Area.

Survey	Method	Location	Results (coho only)	Est. coho density ¹ (units)
USFS (Sep 1977)	Unknown	Mainstem channel	10-60 juv. coho/100 ft	-
		Tributary 1 mouth	few coho	-
ODFW (1990)	E-fishing	Tidal reach	no coho found	-
		Log stringer bridge	34 coho	-
		Middle mainstem	77 coho	-
USFS (Oct 2000)	Snorkel	Pool 1 (tidal)	32 coho	1.28
		Pool 2	8 coho	0.13
		Pool 3	31 coho	0.73
		Pool 4	19 coho	0.95
		Pool 5	7 coho	0.32
		Pool 6	31 coho	0.79
		Pool 7	6 coho	0.80
		Pool 8 (channel dry, isolated pool)	0 coho	0
		Pool 9 (reach dry)	-	-

Critical habitat for OC coho salmon includes Oregon coastal river basins (freshwater and estuarine areas) between Cape Blanco and the Columbia River. Freshwater critical habitat includes all waterways, substrates, and adjacent riparian areas below longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for at least several hundred years) and several dams that block access to former coho salmon habitat. Riparian areas include areas adjacent to a stream that provide the following functions: Shade, sediment, nutrient or chemical regulation, streambank stability, and input of large woody material (LWM) or organic matter.

¹ Densities were only estimated during the USFS 2000 snorkel survey.

1.4 Evaluating Proposed Actions

1.4.1 Biological Requirements

The first step in the methods NMFS uses for applying the ESA section 7(a)(2) to listed salmon is to define the biological requirements of the species most relevant to each consultation. NMFS also considers the current status of the listed species, taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NMFS starts with the determinations made in its decision to list OC coho salmon under the ESA (Weitkamp *et al.* 1995) and also considers new data available that are relevant to the determination.

The relevant biological requirements are those necessary for OC coho salmon to survive and recover to naturally-reproducing population levels at which protection under the ESA will become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

For this consultation, the biological requirements are habitat characteristics that function to support successful spawning, rearing, and migration. The current status of the OC coho salmon, based upon their risk of extinction, has not significantly improved since the species was listed, and in some cases, their status may have worsened.

1.4.2 Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The action area is defined as all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action (50 CFR 402.02). Direct effects occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, hydraulics, sediment and pollutant discharge, and the extent of riparian habitat modifications. Indirect effects may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to habitat degradation. For this consultation, the action area includes the affected streambed, floodplain, and aquatic area of Karnowsky Creek from approximately stream mile 2.5 downstream to stream mile 0, at the Siuslaw River.

The Siuslaw River originates in the Lorane Valley and Low Pass and flows approximately 120 miles to the City of Florence and the Pacific Ocean. The watershed is 773 square miles and predominately consists of coniferous forests. Lower reaches of the Siuslaw River are very wide, with a broad floodplain, numerous wetlands, and tidal islands. Most precipitation in the Siuslaw

River Basin occurs as rain, with approximately 78 percent falling from October through March (WRCC 2002).

The Siuslaw River is on the Oregon Department of Environmental Quality (ODEQ) 303(d) List of Water Quality Limited Water Bodies for temperature (ODEQ 2002). The temperature standard (64 °F) is regularly exceeded (63 percent) during summer flows from the mouth to the headwaters. Historic readings at Mapleton indicate temperature exceedances occurred in 1980, 1982, and 1984 to 1992 with a maximum of 75.2 °F. Temperature monitoring in Karnowsky Creek in 2001 found no exceedances of 64 °F. The maximum observed temperature was 62.0 °F.

Approximately 51 percent of the land holdings within the watershed are under Federal ownership, Forest Service (25 percent) and Bureau of Land Management (26 percent). The state of Oregon owns five percent, and private parties own 41 percent. The remaining three percent is under other public ownership.

The Lower Siuslaw Watershed Analysis (Hollen *et al.* 1998) states:

All watersheds, the mainstem Siuslaw River, and the estuary within the Lower Siuslaw Watershed have been impacted, to varying degrees, by forest management, residential and commercial development, and agricultural activities including timber harvest, road construction, stream cleaning, splash damming, log drives, valley settlement, estuary modification, and livestock grazing.

The Karnowsky Creek watershed is approximately 1,800 acres. The natural condition of Karnowsky Creek has been altered by restrictions of tidal exchange (tide gate), stream cleaning, and land-use practices (agriculture, grazing, and logging). Fish habitat conditions in Karnowsky Creek have been determined to be *poor* (Hollen *et al.* 1998). The BA submitted by the Forest Service provided the following description of Karnowsky Creek:

The lower ¾ mile of Karnowsky Creek is within the tidal influence zone of the Siuslaw River and is primarily in a wetland state at this time. The next ½ mile is a transitional wetland between the tidally influenced wetland and the main valley floor. The next 1-½ miles of stream is located in an open valley dominated by grasses and is still under 2 percent gradient. The last mile of creek enters a closed canopy and the gradient steepens until it reaches the ridge. Map 2 shows the existing condition of the Karnowsky Creek valley and location of the existing channels.

For at least the last 50 years this valley was used for some sort of agricultural production. For 2 miles above private land of the main valley the stream and its main tributaries have been shifted over to the edges of the valley and dikes have

been installed to drain the valley for better agricultural use and maintain the location of the streams on the edges of the valley.

The Forest Service acquired this valley bottom in a land exchange with Davidson Industries in 1992. Davidson continued to have a special use permit for grazing on this parcel until 1997, when they decided not to renew their permit in part due to the listing of the coho salmon in 1996. Since 1997 portions of the valley have begun to return to a more native vegetation community, while other areas have remained severely altered. The last 0.5 mile of open valley has remnant of the old channel through the valley but the current stream bed on the south side of the valley is downcut from 4 to 12 feet down and has drastically lowered the water table of the upper valley. The lower half-mile above private land is dominated by reed canary grass, which gradually reduces in concentration as you go up the valley. In 1998, the FS planted conifer along the margins of the valley to improve shade and provide future large wood to the existing channel.

In the Forest Service portion of Karnowsky Creek, there is 21,650 feet (4.1 miles) of channelized stream, and these channels show the same results documented by Galay (1983) including downcut stream bed, highly eroding banks, and short water retention time. This includes 10,000 feet (1.9 miles) of main stem channel and 11,650 feet (2.2 miles) of side tributaries draining into Karnowsky Creek (Map 2). Three of the four straightened tributary channels go dry in early summer due to the fact that severe upstream degradation (down cutting) has occurred, causing dewatering of the valley bottoms in these areas. The fourth tributary maintains some flow in summer but most likely greatly reduced flow due to down cutting and subsequent drop of the water table. In much of the valley, there are drainage ditches on both sides to catch hill slope runoff.

Given the straightened, down cut condition these channels, there is little potential for floodplain connection or storage in a water table that can be released slowly throughout the summer/fall after winter recharge. In the main stem, there are locations where slides have entered the stream and gravel is accumulating above, causing the bed elevation to rise and the channel to be more connected to the floodplain. In these locations, peak flows escape from the channel and connect to floodplains, but not at the frequency or duration of the historic channel.

The biological requirements of this ESU are not being met under the environmental baseline. The status of OC coho salmon is such that there must be a significant improvement in overall environmental conditions they experience, including the condition of designated critical habitat, over those currently available under the environmental baseline. Within the Siuslaw River Basin, the basin watershed assessment (EcoTrust 2002) states:

The long run goal should be to retain or restore natural processes that are essential to the aquatic ecosystem. But it may in some cases take 50-100 years to achieve this goal. In the meantime, restoration projects should be planned as "temporary bridges" that will improve local habitats until natural process are once again functional. In-stream habitat improvements at this time appear to be most effective in upper watersheds, in relatively confined streams, where flows are most stable, and at natural "flats," where organic and sediment storage is most crucial.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Actions

NMFS expects that the effects of the proposed project will maintain each of the habitat elements over the long term (greater than two years). However, in the short term, NMFS expects a temporary increase in sediment entrainment and turbidity, and disturbance of riparian and instream habitat. Fish may be killed or temporarily displaced during the in-water work. Restoration of Karnowsky Creek to a naturally-meandering channel, in a meadow, and restoration of riparian vegetation is likely to provide long-term benefits to coho salmon and other aquatic species due to the maintenance and restoration of functional habitat conditions.

Potential adverse effects to listed coho salmon from the proposed action include handling injury and mortality due to channel filling and abandonment, lethal and sublethal effects from degraded water quality (*e.g.*, increased turbidity or contaminants), the short-term reduction of benthic food sources, and the alteration of habitat elements.

Sediment

Initial introduction of Karnowsky Creek to relocated channels and excavation of bank material in the wetted channel at the various relocation channel reach connections will temporarily increase sediment loads. An increase in turbidity from suspension of fine sediments can adversely affect fish and filter-feeding macro-invertebrates downstream of the work site. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Spence *et al.* 1996, Berg and Northcote 1985).

To minimize the potential for increased turbidity and disturbance of fish, a majority of the in-water work will occur during July 15 through September 15. Due to marbled murrelet concerns related to helicopter use, the Forest Service proposes some large wood placement within the active channel occur during October. During the summer work period, creek flows are typically low, coho salmon presence is reduced, and rainfall is minimal. The Forest Service will construct the new channels in the dry, thereby reducing turbidity and disturbance of fish. Rearing

juveniles may be present if water temperatures remain within the tolerance range of local individuals, but adult spawning and egg incubation would not be occurring. The precipitation probability increases greatly after September. The Forest Service will delay connection of the new upper-valley channel to the stream flows until the following year. The Forest Service does not propose a delay for the lower-valley reach because seasonal flooding will inundate the constructed channel under less-controlled conditions.

The addition of stream meanders and in-stream structure (*e.g.*, large woody debris) in the new channel will decrease stream velocity, increase floodplain connectivity and sediment deposition, and slow sediment routing in the watershed, benefitting coho salmon habitat and survival.

Prey

As Karnowsky Creek is introduced into the new stream reaches, redistribution of aquatic vegetation and benthic invertebrates will result in a temporary reduction in availability of food for rearing juvenile salmonids. NMFS expects long-term increases in the availability of benthic invertebrates as a food source for juvenile salmonids due to: (1) Increases in total channel length; (2) increases in the complexity of habitat in Karnowsky Creek including in-channel placement of large woody debris; and (3) revegetation of the new channel with planted riparian vegetation.

Riparian Vegetation

Woody riparian vegetation provides large wood to the stream, which helps create pools needed for rearing and retains gravels to create and maintain spawning areas. Riparian vegetation also provides water quality functions (*e.g.* temperature control and nutrient transformation), bank stability, detritus (insect and leaf input, small wood for substrate for insects, etc.), microclimate formation, sediment retention and filtering, and recharge of the stream hyporheic zone. Relocation of the two reaches of Karnowsky Creek back into the open valley floor and away from the existing riparian vegetation may reduce shade, and thereby elevate stream temperatures, for a period of years until the newly planted vegetation begins to shade the new stream channel. In the interim, the placement of wood, increased pool frequency, and construction of rearing ponds at tributary junctions will assist in ameliorating temperature increases. In the long term, the stream temperature regime will be restored as the channel reconnects to the water table, stores more subsurface water, and increases summer base flow.

Stream Hydraulics

NMFS expects long-term beneficial effects to habitat forming and maintaining processes in Karnowsky Creek, such as large woody debris recruitment, channel migration, and floodplain connectivity. The removal of the Skunk Cabbage Creek culverts will decrease hydraulic constriction, improve fish passage, and improve general ecological connectivity such as sediment transport and large woody debris transport within the drainage. Increasing channel complexity and floodplain connectivity will contribute to restoring natural hydrologic function

within the watershed by raising the water table, storing more subsurface water, and increasing summer base flow.

Fish Barriers

The removal of the Skunk Cabbage Creek culverts will improve fish passage in this tributary.

Fish Rescue, Salvage, and Relocation

As a result of the Karnowsky Creek channel relocations, extensive reaches of the degraded channel will be plugged, isolated, and/or dewatered. Rescue, salvage, and relocation of fish and other aquatic species will result in the potential capture and handling of juvenile (predominately age-0) coho salmon. NMFS assumes a five percent direct or delayed mortality rate from capture and relocation stress is likely to occur. NMFS does not expect the fish stranded in reaches isolated by channel abandonment to survive unless they are relocated.

Chemical Contamination

As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the backhoes, excavators, and other equipment requires the use of fuel, lubricants, etc., which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non target riparian vegetation (Spence *et al.* 1996).

To minimize the potential for chemical contamination and disturbance of fish, the Forest Service has proposed the following conservation measures:

1. A spill-response plan will be developed to prevent and control the entry of fuel, hydraulic oil, or other chemicals into streams.
2. A spill-response kit will remain on site whenever equipment is operating. Materials will be sufficient to absorb 34 gallons of oil and designed to float while absorbing oil and repelling water.
3. Heavy equipment operation and fill placement within the wetted stream channels will be restricted to the dry season (July 15 - September 15), except where large wood placement will occur using helicopters.
4. Equipment refueling will occur 150 feet from live water wherever possible. Some portions of the valley are so narrow that refueling will be less than 150 feet from the

water. In those areas, upland sites will be developed that will contain any accidental spills.

5. Machinery will be parked in a predetermined location when not in use that will reduce the risk of contamination of the stream.
6. Heavy equipment will be inspected daily before beginning work.

1.5.2 Effects on Critical Habitat

NMFS designates critical habitat based on physical and biological features that are essential to the listed species. Essential features of designated critical habitat that could be affected by the project are substrate, water quality, food, and safe passage. Effects to critical habitat from these categories are included in the effects description expressed above in section 1.5.1, *Effects of Proposed Action*.

1.5.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed action.

NMFS is not aware of any specific future non-federal activities within the action area that would cause greater effects to listed species than presently occurs. NMFS assumes that future private and state actions influencing habitat conditions within the action area will continue at similar intensities as currently occurs.

1.6 Conclusion

After reviewing the current status of the listed species, the environmental baseline for the action area, the effects of the proposed habitat restoration, and cumulative effects, NMFS has determined that the Karnowsky Creek Restoration Project, as proposed, is not likely to jeopardize the continued existence of OC coho salmon, and is not likely to destroy or adversely modify designated critical habitat for this ESU. This determination is based, in part, on incorporation of best management practices (BMPs) into the proposed project design (*e.g.*, limiting in-water work to the dry season, avoiding bank hardening, and excavating new channels in isolation from flowing water), but also on the following considerations: (1) In-water work

will occur when juvenile coho salmon presence is reduced, and adults and eggs are not present, (2) channel realignment will re-establish habitat complexity and function, and (3) the project was designed to reflect past successes in habitat restoration.

1.7 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitats, or to develop additional information. NMFS believes the following conservation recommendations are consistent with these obligations, and therefore should be implemented by the Forest Service:

1. In order to minimize effects to benthic prey organisms, the Forest Service should consider using substrate material from the existing channels to seed the new channel reaches.
2. In order to minimize effects from stranding of fish, the Forest Service should consider incrementally ramping down flows in the old channel to encourage volitional outmigration of fish before completely plugging channel and beginning fish salvage operations.

1.8 Reinitiation of Consultation

This concludes formal consultation on these actions in accordance with 50 CFR 402.14(b)(1). The Forest Service must reinitiate consultation if: (1) The amount or extent of incidental take is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the biological assessment and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

2. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered species and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly

impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, and sheltering (50 CFR 217.12). Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be a prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

2.1 Amount or Extent of Take

The proposed action covered by this Opinion is reasonably certain to result in incidental take of listed species in the form of detrimental effects to survival, physiology, and behavior from increased sediment levels (non-lethal) and harassment and stress from in-water work (lethal and non-lethal). Effects of actions such as these are largely unquantifiable in the short term, except for take from fish relocation and handling. The proposed work in the long term is highly likely to benefit the listed species through restoration of the stream network and watershed. Short-term adverse effects may cause relatively high amounts of lethal and non-lethal take. Diligent adherence to the proposed BMPs during project implementation would minimize this take and avoid catastrophic loss of individuals. Due to the difficulty of quantifying the full extent of take and the lack of a recovery plan for this species, it is difficult for NMFS to quantify effects of the expected take on the OC coho salmon ESU.

Therefore, even though NMFS expects some non-lethal and lethal incidental take to occur due to the action covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate the entire amount of incidental take to the listed species. In instances such as this, NMFS designates the expected amount of take in terms of the extent of take allowed. Therefore, NMFS limits the extent of allowable unquantified incidental take during construction to take resulting from actions as proposed in the BA that occur in that area of Karnowsky Creek from approximately stream mile 0 to 2.5. Incidental take occurring beyond these areas is not authorized by this Opinion.

NMFS anticipates incidental take of up to 1,450 juvenile coho salmon could occur as a result of fish rescue, salvage, and relocation activities covered by this Opinion. Assuming three percent of captured fish will perish during handling due to stress or injury, NMFS limits incidental lethal take to 44 juvenile coho salmon. Incidental lethal take greater than this amount during fish rescue, salvage, and relocation activities is not authorized by this Opinion.

2.2 Reasonable and Prudent Measures

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the listed species.

1. Minimize the likelihood of incidental take from activities involving channel relocation, temporary access roads, use of heavy equipment, earthwork, site restoration, or that may otherwise involve in-water work or affect fish passage by avoiding or minimizing disturbance to riparian and aquatic systems.
2. Minimize the likelihood of incidental take from activities involving fish salvage and relocation.
3. Complete a comprehensive monitoring and reporting program to ensure implementation of these conservation measures are effective in minimizing the likelihood of take from permitted activities.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above.

1. To Implement Reasonable and Prudent Measure #1 (riparian and aquatic systems), the Forest Service shall:
 - a. In-Water Work.
 - i. All work within the active channel of Karnowsky Creek will be completed from July 15 to September 31 of a given year, except as follows:
 - (1) Large wood may also be placed in the active channel from October 1 to October 31.
 - (2) No in-water work shall take place outside the in-water work periods described above without prior written authorization from NMFS.
 - ii. Wood placed within the active channel shall not be cabled or staked in place, except as follows.
 - (1) Hemp rope, or equivalent biodegradable material, may be used.
 - (2) Cable may be used sparingly to secure wood at transition pools located at ditch/new channel junctions.
 - iii. The diversion or withdrawal of any water from natural streams for construction or for irrigating riparian plantings will comply with all state and Federal laws, particularly those that require a temporary water right and screening of intakes. The Forest Service shall be responsible for informing all contractors and project participants of their obligations to comply with existing, applicable statutes.
 - iv. All project phases shall be implemented in such a manner as to minimize fish entrapment.

- b. Erosion and Pollution Control.
 - i. A Pollution and Erosion Control Plan (PECP) will be developed for each authorized project to prevent point-source pollution related to construction operations. The PECP will contain the pertinent elements listed below and meet requirements of all applicable laws and regulations:
 - (1) Methods that will be used to prevent erosion and sedimentation associated with access roads, construction sites, operations, equipment and material storage sites, fueling operations and staging areas.
 - (2) A description of the hazardous products or materials that will be used, including inventory, storage, handling, and monitoring.
 - (3) A spill containment and control plan with notification procedures, specific clean-up and disposal instructions for different products, quick response containment and clean-up measures that will be available on site, proposed methods for disposal of spilled materials, and employee training for spill containment.
 - ii. Where feasible, sediment-laden water created by construction activity shall be filtered before it leaves the project area or enters an aquatic resource area.
 - iii. Areas for fuel storage, refueling, and servicing of construction equipment and vehicles will be located above the 10-year floodplain of any water body.
 - iv. No surface application of nitrogen fertilizer will be done within 50 feet of any aquatic resource.
 - v. The use of pesticides, including herbicides, are not authorized under this consultation.
 - c. Riparian Habitat Protection.
 - i. Alteration or disturbance of riparian vegetation along the existing channel shall be minimized until such time as it is abandoned.
2. To implement Reasonable and Prudent Measure #2 (fish salvage and relocation), the Forest Service shall ensure that:
- a. Seining. If the fish-salvaging aspect of this project requires the use of seine equipment to capture fish, it must be accomplished as follows:
 - i. Before dewatering, attempts will be made to seine and release fish from the work isolation area as is prudent to minimize risk of injury.
 - ii. Seining will be conducted by, or under the supervision of a fishery biologist experienced in such efforts. Staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

- iii. ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during seining and transfer procedures.
 - iv. Seined fish must be released as near as possible to capture sites.
 - v. Retention or relocation of captured fish out of the watershed is not permitted.
 - vi. Any other Federal, state, and local permits and authorizations necessary for the conduct of the seining activities will be obtained prior to project seining activity.
 - vii. Notify NMFS (503.230.5419) a minimum of one week prior to commencing seining activities.
 - viii. A description of any seine and release effort will be included in a post-project report, including the name and address of the supervisory fishery biologist, methods used to isolate the work area and minimize disturbances to ESA-listed species, stream conditions before and following placement and removal of barriers, the means of fish removal, the number of fish removed by species, the condition of all fish released, and any incidence of observed injury or mortality.
- b. Electrofishing. If the fish-salvaging aspect of this project requires the use of electrofishing equipment to capture fish, it must be accomplished as follows (NMFS 2000):
- i. Notify NMFS (503.230.5419) a minimum of one week prior to commencing electrofishing activities.
 - ii. Electrofishing may not occur near listed adults in spawning condition or near redds containing eggs.
 - iii. Equipment must be in good working condition. Operators must go through the manufacturer's preseason checks, follow all provisions, and record major maintenance work in a log.
 - iv. A crew leader having at least 100 hours of electrofishing experience in the field using similar equipment must train the crew. The crew leader's experience must be documented and available for confirmation; such documentation may be a logbook. The training must occur before an inexperienced crew begins any electrofishing; it must also be conducted in waters that do not contain listed fish.
 - v. Measure conductivity and set voltage as follows:

<u>Conductivity (umhos/cm)</u>	<u>Voltage</u>
Less than 100	900 to 1100
100 to 300	500 to 800
Greater than 300	150 to 400

- vi. Direct current (DC) must be used at all times.

- vii. Each session must begin with pulse width and rate set to the minimum needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured. Start with pulse width of 500 microseconds (ms) and do not exceed 5 milliseconds. Pulse rate should start at 30 Hz and work carefully upwards. In general, pulse rate should not exceed 40 Hz, to avoid unnecessary injury to the fish.
- viii. The zone of potential fish injury is 0.5 m from the anode. Care should be taken in shallow waters, undercut banks, or where fish can be concentrated because in such areas the fish are more likely to come into close contact with the anode.
- ix. The monitoring area must be worked systematically, moving the anode continuously in a herringbone pattern through the water. Do not electrofish one area for an extended period.
- x. Crew members must carefully observe the condition of the sampled fish. Dark bands on the body and longer recovery times are signs of injury or handling stress. When such signs are noted, the settings for the electrofishing unit may need adjusting. Sampling must be terminated if injuries occur or abnormally long recovery times persist.
- xi. Whenever possible, a block net must be placed below the area being sampled to capture stunned fish that may drift downstream.
- xii. The electrofishing settings must be recorded in a logbook along with conductivity, temperature, and other variables affecting efficiency. These notes, with observations on fish condition, will improve technique and form the basis for training new operators.
- xiii. A description of any electrofishing effort will be included in a post-project report, including the name and address of the supervisory fishery biologist, methods used to minimize disturbances to ESA-listed species, stream conductivity during electrofishing, the voltage used to shock, the means of fish removal, the number of fish removed by species, the condition of all fish released, and any incidence of observed injury or mortality.

3. To Implement Reasonable and Prudent Measure #3 (monitoring and reporting), the Forest Service shall ensure that:

- a. Construction Reports. Submit construction reports in order that NMFS may determine the actual effects of the proposed action. Construction reports shall be submitted to NMFS within 90 days following the completion of each project phase (Phase I and Phase II). At a minimum, these reports shall consist of the following information:
 - i. Project Identification.
 - (1) Project name;

- (2) NMFS' identifying OHB number;
 - (3) starting and ending dates for work performed during the reporting period; and
 - (4) the Forest Service contact person.
- ii. Pollution and Erosion Control. A summary of any pollution and erosion control inspection reports, including the downstream extent and duration of any turbidity plume, descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.
- iii. Assessment of Effects.
 - (1) Narrative description of the new channel characteristics prior to and immediately following hydrologic connection (e.g., bank condition, substrate composition, stream slope, thalweg length, pool quantity and quality, and number of complex wood structures).
 - (2) Planting composition and density.
 - (3) A narrative assessment of the project's effects on natural stream function.
 - (4) Fish relocation results as detailed above (Term and Condition 2.a.viii, 2.b.xii, and 2.b.xiii).
- iv. Documentation. Photographic documentation of environmental conditions at the project site before, during, and after project completion.
 - (1) Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
 - (2) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
 - (3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernible environmental conditions at the project area, and upstream and downstream of the project.
 - (4) When developing photographic documentation, refer to the Forest Service photo point monitoring handbook (<http://www.fs.fed.us/pnw/pubs/gtr526/>).
- b. Monitoring Plan. Submit a project monitoring plan to NMFS prior to commencing work on the subject action.
 - i. Monitoring shall commence at project implementation and continue for a minimum of three years following completion of Phase II.
 - ii. All new channel reaches and modified old channel reaches potentially containing fish during any portion of the year shall be monitored.

- iii. At a minimum, monitoring shall include water temperature, turbidity, coho salmon distribution and abundance, and riparian vegetation establishment.
- iv. NMFS shall receive a copy.
- c. Submittal. The monitoring plan and monitoring results shall be submitted to:

National Marine Fisheries Service
Oregon Habitat Branch, Habitat Division
Attn: OHB2002-0083
525 NE Oregon Street, Suite 500
Portland, OR 97232

3. MAGNUSON-STEVENSON ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance essential fish habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2)).
- NMFS must provide conservation recommendations for any Federal or state action that would adversely affect EFH (§305(b)(4)(A)).
- Federal agencies must provide a detailed response in writing to NMFS within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NMFS' EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities, "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem, and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). "Adverse effect" means

any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

EFH consultation with NMFS is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA, the Pacific Fisheries Management Council (PFMC) has designated EFH for Federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon, and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas et al. (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the Forest Service.

3.3 Proposed Actions

The proposed action and action area are detailed above in Sections 1.2 and 1.4.2, respectively, of this Opinion. The action area includes habitats that have been designated as EFH for various life-history stages of groundfish, coastal pelagic, and Pacific salmon species (Table 4).

3.4 Effects of Proposed Action

As described in detail in section 1.5 of this Opinion, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects are:

(1) Turbidity - The hydrologic connection of the new channels and the plugging of existing channels will increase turbidity and may injure juvenile fish present in the action area; (2) Siltation - The deposition of sediments may reduce salmon egg-to-fry survival downstream of the existing channel; (3) Prey - The availability of benthic prey organisms will likely be limited for several months until the new channel is colonized, and siltation may also temporarily reduce benthic organism populations in downstream reaches; (4) Temperature - The realignment of the stream into the valley center away from established riparian vegetation may reduce stream shade and elevate stream water temperatures for several years, until sufficient vegetation develops to shade the channel; (5) Stranding - Channel abandonment may strand juvenile fish not previously removed from the subject stream reach, and the remaining fish will perish; and (6) Contaminants - As with any activity using heavy equipment, the accidental release of fuel oil and other contaminants into the water may occur, and fish exposed to these contaminants may suffer lethal or sublethal effects.

3.5 Conclusion

NMFS concludes that the proposed action would adversely affect the EFH for **the groundfish, coastal pelagic, and Pacific salmon species listed in Table 4.**

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NMFS is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NMFS understands that the conservation measures described in the biological assessment will be implemented by the Forest Service, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. However, the Conservation Recommendations in section 1.7, and the Terms and Conditions outlined in section 2.3 are generally applicable to designated EFH for the species in Table 4, and address these adverse effects. Consequently, NMFS incorporates them here as EFH conservation recommendations.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(j), Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must

explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The Forest Service must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(k)).

Table 4. Species with Designated EFH Found in Waters of the State of Oregon.

Ground Fish Species	Blue rockfish (<i>S. mystinus</i>)	Rougheye rockfish (<i>S. aleutianus</i>)	Flathead sole (<i>Hippoglossoides elassodon</i>)
Leopard shark (<i>Triakis semifasciata</i>)	Bocaccio (<i>S. paucispinis</i>)	Sharpchin rockfish (<i>S. zacentrus</i>)	Pacific sanddab (<i>Citharichthys sordidus</i>)
Soupfin shark (<i>Galeorhinus zyopterus</i>)	Brown rockfish (<i>S. auriculatus</i>)	Shortbelly rockfish (<i>S. jordani</i>)	Petrale sole (<i>Eopsetta jordani</i>)
Spiny dogfish (<i>Squalus acanthias</i>)	Canary rockfish (<i>S. pinniger</i>)	Shorttraker rockfish (<i>S. borealis</i>)	Rex sole (<i>Glyptocephalus zachirus</i>)
Big skate (<i>Raja binoculata</i>)	Chilipepper (<i>S. goodei</i>)	Silvergray rockfish (<i>S. brevispinus</i>)	Rock sole (<i>Lepidopsetta bilineata</i>)
California skate (<i>R. inornata</i>)	China rockfish (<i>S. nebulosus</i>)	Speckled rockfish (<i>S. ovalis</i>)	Sand sole (<i>Psettichthys melanostictus</i>)
Longnose skate (<i>R. rhina</i>)	Copper rockfish (<i>S. caurinus</i>)	Splitnose rockfish (<i>S. diploproa</i>)	Starry flounder (<i>Platyichthys stellatus</i>)
Ratfish (<i>Hydrolagus colliei</i>)	Darkblotched rockfish (<i>S. crameri</i>)	Stripetail rockfish (<i>S. saxicola</i>)	
Pacific rattail (<i>Coryphaenoides acrolepsis</i>)	Grass rockfish (<i>S. rastrelliger</i>)	Tiger rockfish (<i>S. nigrocinctus</i>)	Coastal Pelagic Species
Lingcod (<i>Ophiodon elongatus</i>)	Greenspotted rockfish (<i>S. chlorostictus</i>)	Vermillion rockfish (<i>S. miniatus</i>)	Northern anchovy (<i>Engraulis mordax</i>)
Cabezon (<i>Scorpaenichthys marmoratus</i>)	Greenstriped rockfish (<i>S. elongatus</i>)	Widow rockfish (<i>S. entomelas</i>)	Pacific sardine (<i>Sardinops sagax</i>)
Kelp greenling (<i>Hexagrammos decagrammus</i>)	Longspine thornyhead (<i>Sebastolobus altivelis</i>)	Yelloweye rockfish (<i>S. ruberrimus</i>)	Pacific mackerel (<i>Scomber japonicus</i>)
Pacific cod (<i>Gadus macrocephalus</i>)	Shortspine thornyhead (<i>Sebastolobus alascanus</i>)	Yellowmouth rockfish (<i>S. reedi</i>)	Jack mackerel (<i>Trachurus symmetricus</i>)
Pacific whiting (Hake) (<i>Merluccius productus</i>)	Pacific Ocean perch (<i>S. alutus</i>)	Yellowtail rockfish (<i>S. flavidus</i>)	Market squid (<i>Loligo opalescens</i>)
Sablefish (<i>Anoplopoma fimbria</i>)	Quillback rockfish (<i>S. maliger</i>)	Arrowtooth flounder (<i>Atheresthes stomias</i>)	
Aurora rockfish (<i>Sebastes aurora</i>)	Redbanded rockfish (<i>S. babcocki</i>)	Butter sole (<i>Isopsetta isolepsis</i>)	Salmon
Bank rockfish (<i>S. rufus</i>)	Redstripe rockfish (<i>S. proriger</i>)	Curlfin sole (<i>Pleuronichthys decurrens</i>)	Coho salmon (<i>O. kisutch</i>)
Black rockfish (<i>S. melanops</i>)	Rosethorn rockfish (<i>S. helvomaculatus</i>)	Dover sole (<i>Microstomus pacificus</i>)	Chinook salmon (<i>O. tshawytscha</i>)
Blackgill rockfish (<i>S. melanostomus</i>)	Rosy rockfish (<i>S. rosaceus</i>)	English sole (<i>Parophrys vetulus</i>)	

4. LITERATURE CITED

Section 7(a)(2) of the ESA requires biological opinions to be based on the best scientific and commercial data available. This section identifies the data used in developing this Opinion.

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